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UNITED STATES DEPARTMENT OF AGRICULTURE

BULLETIN No. 346

Contribution from the States Relations Service
A. C. TRUE, Director

Washington, D. C. PROFESSIONAL PAPER February 21, 1916

HOME PROJECTS IN SECONDARY COURSES IN AGRICULTURE.[1]

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INTRODUCTION.

Elementary agriculture is taught in a large number of high schools in much the same manner that academic subjects are taught. It is evident that the aim in these classes is to arouse interest and to give information about farming. During the last two or three years, however, there has been a remarkable increase in the number of schools which are conducting more extensive courses in agriculture. Most of the schools which devote more than one year to this subject employ a teacher who has had special training in agricultural subjects. A recent investigation made by the States Relations Service revealed the fact that the predominating aim in these schools is vocational—i. e., that they are attempting to train their students for actual farm practice. In the attempt to make the teaching of agriculture practical teachers and school officers have met with difficult problems. Many have felt that the only solution of the problems of practical work is for the school to own land upon which the student might see a demonstration of principles and put into practice what he learns. The school farm has not solved the problem satisfactorily for all and has presented new problems which are

[1] Prepared under the supervision of C. H. Lane, Chief Specialist in Agricultural Education, States Relations Service.

Note.—This bulletin gives information regarding the home-project plan of teaching agriculture and is of interest primarily to teachers in secondary rural schools.

17149°—Bull. 346—16——1

demanding attention.[1] Many teachers and investigators have felt that a wider use should be made of the home farm in the teaching of agriculture. It is the aim of this bulletin to give suggestions toward making the home farm a more definite factor in agricultural instruction through what is known as the home-project plan. In his study of this plan the writer has gleaned many suggestions from the work done in Massachusetts and New York.

DEVELOPMENT OF THE HOME-PROJECT IDEA.

The part-time method in industrial education.—In recent years considerable attention has been given to European methods of vocational education, with a result that new methods have been introduced into this country and more attention has been given methods already used here to a limited extent. One of these methods is the part-time cooperative plan of industrial education. Under this method there is cooperation between the school and the factory or industrial center, so that students may spend part of their time in school and part of their time in the factory or shop. The work of school and shop are supplementary to each other. As the part-time idea is an effort to bring the school and factory together, so the home-project plan is an effort to bring the home and school together. The farm may be considered as the industrial center of the country. The home-project plan may be considered as an effort to utilize this center in agricultural education.

The project idea in science teaching.—Agriculture has followed science in its methods of teaching. As science has been taught in the high school mostly through the textbook and laboratory method, so the study of agriculture has been a study of books accompanied by laboratory exercises. In recent years progressive teachers of science have made an effort to break away from textbooks and formal laboratory work and adapt their teaching to the environment of their students. Students have been assigned special problems at home which would involve the principles studied at school. These problems were called projects. When electricity was studied in a certain school one student was given the wiring of his father's house as a project in which he could apply the principles learned. Another student made a study of the germination of seeds and other problems involved in his home garden in connection with a study of plant growth. It was apparent that if this method were successful in science teaching that it could be applied even more successfully in the teaching of agriculture.

[1] For a general study of the problems arising in the use of land in connection with agricultural teaching, see the following reports of a special committee appointed to investigate the subject by the American Association for the Advancement of Agricultural Teaching: U. S. Bur. Ed. Bul. 522 (1913), pp. 24-39; 601 (1914), pp. 49-76. See also The Use of Land in Teaching Agriculture in Secondary Schools, U. S. Dept. Agr. Bul. 213 (1915).

The Massachusetts home-project plan.—Massachusetts was the first State to give State aid to vocational agriculture based upon the home-project plan. In 1911 the State legislature made State funds available for the establishment of vocational agricultural schools and departments according to plans submitted by the Massachusetts Board of Education. Departments of vocational agriculture may be established in high schools and if approved by the State board of education the communities which maintain them are reimbursed to the extent of two-thirds of the salary of the agricultural instructor. This instructor must be a specially qualified person who devotes his entire attention to agriculture.

Teachers are employed in these schools and departments for the entire year. The summer time is spent in supervising the home projects of students. Usually some time is allowed in the winter for a vacation and for professional improvement. The class work is centered around the home project, which is required of each agricultural student. Before the boy enters the work parents must agree to furnish the facilities for carrying out the particular instructions of his teacher. In each district where vocational agricultural training is established an advisory committee consisting of five members is appointed to cooperate with the agricultural instructor in adapting the agricultural training to the particular needs of the locality.[1]

Other States giving State aid.—Since the home-project plan was introduced into Massachusetts, the States of New York, Pennsylvania, New Jersey, and Indiana have given State aid to vocational agriculture based upon this plan. In all of these States distinction is made between agriculture as ordinarily taught in the high school and vocational agriculture. The use of State funds in each of the States is dependent upon organization and supervision by State officials.

Extension of the project idea.—The success of the home-project plan in States which are making it the basis of their instruction in vocational agriculture has led to a wide interest in the plan and to an application of the idea in schools of other States. In many sections agricultural students are doing practical work in clubs which have a relation more or less close to their school work. Many schools in their effort to make the teaching of agriculture practical have secured land to be used by the students. These school farms have not proved satisfactory in all cases. Other schools either have not deemed it wise or have not seen their way clear to purchase or lease land for school use. All of these schools should be interested in a plan to utilize the home farms of the students in connection with the teaching of agriculture.

[1] For an exposition of the Massachusetts plan, see U. S. Bur. Ed. Bul. 579 (1914).

Lack of unity in definition.—In many sections where teachers talk of projects there seems to be a lack of understanding of the plan and a lack of unity in definition of the term. According to some teachers any effort toward giving their work a practical turn is termed a project. Others have used the word in lieu of "practicum," so that simple laboratory exercises are spoken of as projects. In a general way a project is anything mapped out or planned to be done. The term has been used for years by this department in connection with its work and that of the experiment stations. The term, "home project," however, has come to have a special meaning in connection with the teaching of agriculture. It is essential that this meaning be agreed upon before plans for carrying out the idea are discussed.

ESSENTIALS OF A SUCCESSFUL PROJECT.

Definition.—The following definition of a home project is suggested: The term "home project" applied to instruction in elementary and secondary agriculture includes each of the following requisites: (1) There must be a plan for work at home covering a season or a more or less extended period of time; (2) it must be a part of the instruction in agriculture of the school; (3) there must be a problem more or less new to the pupil; (4) the parents and pupil should agree with the teacher upon the plan; (5) some competent person must supervise the home work; (6) detailed records of time, method, cost, and income must be honestly kept; and (7) a written report based on the record must be submitted to the teacher. This report may be in the form of a composition or a booklet.

A project to cover an extended period at home.—A distinction should be drawn between a project and a simple exercise used as a practicum to illustrate some principle, or for the purpose of increasing skill in some operation of farm or shop. A project, to be worthy of the name, should involve skill in many operations and the application of a number of principles. To accomplish this it should cover a branch of farming that will extend over a comparatively long period of time. The testing of seed corn may be cited as an example of a simple laboratory exercise performed at school. The stringing of seed corn would be a suitable home practicum, the aim of which would be to acquire skill in a useful operation. The growing of an acre of corn would involve both of these operations and many others, hence it would be a worthy project.

It is obvious that if the term "home project" is applied in a strict sense the work should be carried on at home. In case a suitable project may not be arranged for a student at home, there should be no objection to the student working away from home. If this work

can be properly correlated with his course of study and meet other requirements of a project there should be no objections to accepting it as a substitute for a home project.

The project to be a part of the instruction in agriculture.—The project should have a definite relation to the course of study. If the student is taking a course in farm crops his project should be along the line of crop production; if he is studying animal husbandry, his project should be connected with the care of animals; projects in fruit growing or vegetable gardening may accompany courses in horticulture; and if a special course in farm management is given, special problems of management should be assigned as projects.

Boys and girls not taking the course in agriculture may be induced to take up some special phase of practical agriculture at home, but such work does not come within the definition of a project. A student while taking a course in animal husbandry may start to keep records of the home herd in connection with a dairy project, his interest may cause him to continue the work the following year while he is taking a course in fruit growing, but some work pertaining to the production of fruit should then constitute his main project.

The project to present a new problem.—It should be borne in mind that the primary aim of the home project is educational. A project should be considered in the light of what the student may learn from it in principle and practice. A student may grow an acre of corn year after year and continue to learn something new, but if the work of the first year has been properly planned and supervised it will have far greater educational value than in the succeeding years. After growing corn one year the student may better take up some other crop or, better still, an entirely different phase of farming.

Pupil, parents, and teacher unite upon plan.—The home project when properly administered is an excellent means of bringing the home and school together in their educational problems. The teacher should know the home conditions surrounding the student and should not attempt to plan a project without first getting the consent of the parents. Not only should their consent be obtained, but every attempt should be made to secure their hearty cooperation. Whether a written agreement is made or not will depend upon the relation of the project to the plan upon which the agricultural course is conducted. In productive projects and in other projects as far as possible, the student should be given entire responsibility regarding the work and should have a financial interest in its outcome. If the student is using his father's land or live stock, he should pay rent or interest on a fair valuation. He should work with an understanding that he will participate in the profits, if they are not all to be his, and at the same time feel that he will be responsible for any losses.

Competent supervision essential.—Supervision is necessary in order that those in charge may be sure the work is carried out as outlined. It is even more essential that some one take an active interest in aiding with problems which may arise, and in giving encouragement. Where it can be arranged it will prove most satisfactory as a rule to have the teacher who is conducting the class work supervise the projects connected with the courses given. The summer season is the most important time for most projects, hence in States where the teaching of agriculture is based upon the home project, teachers are employed for the entire year. If any vacation is allowed them it is taken in the winter. Effective supervision means frequent visits to the homes of the students. In districts where the students are scattered over a wide area, some special means of transportation will be essential to efficient service.

Detailed records to be kept.—A valuable part of the training secured in connection with carrying out a project will be obtained in the keeping of accurate records and accounts. It will be helpful, if not absolutely necessary, to give a few lessons in elementary cost accounting before the work is begun. The record should cover points learned in connection with study relating to the project as well as experience gained in practice. In keeping accounts such items as rent of land and interest on investment should not be overlooked. Accurate account should be kept of the time expended and charges and credits made upon a fair basis. Accuracy and fairness are especially important in the keeping of accounts where there is any contest feature in conducting the projects.

The following record blank for a potato project may be adapted to other crops. It is suggestive of forms which may be used for other kinds of projects.

Record blank for potato project.

SOIL PREPARATION.

Character of soil.....	Crop for 5 years past.....
Date of plowing.....	Dates of harrowing.....
Implement used.....	Implements used.....
Depth plowed.....	Cost of harrowing.....
Cost of plowing.....	Condition of land when planted.....

CROP PLANTING AND CULTIVATION.

Variety of potatoes planted.....	Kind of fertilizer.....
Kind of seed.....	Amount of fertilizer per acre.....
Cost of seed and planting.....	Cost of fertilizer.....
Depth of planting.....	Dates of cultivation.....
Distance of planting.....	Implements used.....
Percentage of stand.....	Cost of cultivation.....

HARVEST AND YIELD.

Date of digging..... Yield in marketable potatoes.....
Method of digging..... How disposed of.....
Days from planting to digging..... Cost of harvest and marketing.....
Total yield.....
Remarks.....
.....
.....

Approved:

.....Teacher.
.....Student Age.....
Post office..... School.....
County.....

Estimate the rental of your land and your time at a fair valuation. Count all commercial fertilizers at actual cost and barnyard manure at what it would bring in the district.

EXPENSES.

Rent of land.....$.....
Preparation of seed bed:
Horse labor..... .....
Student's labor..... .....
Cost of seed..... .....
Cost of planting:
Horse labor..... .....
Student's labor..... .....
Cost of fertilizer..... .....
Cost of cultivation:
Horse labor..... .....
Student's labor..... .....
Cost of digging:
Horse labor..... .....
Student's labor..... .....
Cost of sacking, storing, and marketing..... .....

Total cost.....$.....

RECEIPTS.

Total value of marketable potatoes, ... bushels, at ....$.....
Value of cull potatoes, ... bushels, at ....
Value of potatoes kept for seed, ... bushels, at ....

Total receipts..... .....

Net profit..... .....

A written report to the teacher.—The records kept are to be made the basis of a written report to the teacher upon the completion of the project. This report may be in the form of a composition, or it may be somewhat of the nature of a thesis. There is an excellent opportunity in this work to correlate the work in agriculture with the work in English. Teachers and supervising officers will find among these reports some which may be used to advantage in arousing interest in the work. Photographic records will be found very useful for the same purpose.

SOME PROJECT OUTLINES.

Classification of projects.—If a class in agriculture should undertake to build a henhouse upon the school grounds or to prune or spray a neighboring orchard, such work may be called a class project or a group project. In this discussion individual home projects as previously defined are considered. Home projects may be grouped according to their chief aim as follows:

Production projects.—Those projects in which the chief aim is to produce any agricultural product at a profit.

Demonstration projects.—Those projects in which the chief aim is to demonstrate materials and methods in agricultural practice. (If there is any uncertainty as to results which should be expected it may be better to call such demonstrations experimental projects.)

Improvement projects.—Those projects in which the chief aim is to make improvement with hope of little immediate returns.

Management projects.—Those projects in which the chief aim is to apply efficiently the general principles of farm management.

The project study outline.—Although teachers may make outlines to be used by the students as guides in their study and work, it may be better to have students make their own outlines. These outlines may be arranged with one of the following purposes in mind: (*a*) As a guide to a study of the subject, (*b*) as a basis for a practical plan for carrying out the project, and (*c*) as a combination of both study guide and working plan. The latter idea has been used in the outlines which follow. These outlines cover a range of projects and are offered as suggestions of one method of treatment. The teacher may aid the student by indicating in the outline references which students may use in finding answers to the questions asked.

POTATO PROJECT STUDY OUTLINE.

GROWING AN ACRE OF POTATOES—A PRODUCTION PROJECT.

I. Shall I grow potatoes for my project?
   1. Is this section adapted to potatoes?
   2. Is my soil suitable for growing potatoes?
   3. Can I control all pests and diseases which prevail in this district?
   4. Is there a good prospect for potatoes paying a profit this year?

II. What shall be my aim in potato production?
   1. Shall I grow late potatoes for winter use?
   2. Shall I grow early potatoes for the market?
   3. Shall I grow potatoes for seed?
   4. Shall I make a combination of the aims above?
   5. To which is my soil best adapted?
   6. Which offers the greatest prospect for returns?
   7. Which will fit in best with my work at home and at school?

III. How shall I prepare my land?
1. Has the previous crop and treatment of the land left it in suitable condition?
2. What crop should I use to prepare the soil for a future potato crop?
3. When and how should barnyard manure be used for a crop of potatoes?
4. Can I afford to use commercial fertilizers on my potato land; if so, how much of what kind?
5. When shall I plow and how deep?
6. What other preparation is necessary?

IV. What seed shall I plant?
1. What varieties are grown in this district?
2. Are there better varieties which would suit local conditions and my particular needs?
3. Shall I buy home-grown seed?
4. Shall I pay extra for selected seed?

V. How shall I plant my seed potatoes?
1. When shall I plant?
2. Shall I let my seed sprout before planting?
3. How shall I cut the seed potatoes?
4. Is there any danger from scab; if so, how shall I treat my seed potatoes to prevent infection?
5. What is the proper depth and distance for planting?

VI. How shall I cultivate my potatoes?
1. What are the purposes of cultivation which I should bear in mind?
2. What cultivation may they need before they are out of the ground?
3. Shall I practice level culture or the hill method?
4. What type of cultivator will serve my purpose best in row cultivation?
5. When and for what purpose shall I use a hoe?
6. What particular weeds must I guard against?

VII. How can I control insect pests and potato diseases?
1. What are the prevalent insect pests and diseases of potatoes in this district?
2. What spray mixture will kill a biting insect like the Colorado potato beetle?
3. How shall I make Bordeaux mixture if fungus diseases are threatening?
4. Can I use a combination that will destroy insects and prevent disease?
5. What kind of spraying outfit will best serve my needs?
6. Will it pay me to buy a spray outfit or hire my spraying done?

VIII. How shall I select my seed potatoes for next year?
1. Shall I mark some of the promising plants and make a hill selection?
2. Shall I depend upon selection from the bin or upon the purchase of selected potatoes?

IX. How shall I handle my potato crop?
1. When shall I harvest my potatoes?
2. Shall I dig my potatoes by hand, use a plow, or hire some one to dig them by machinery?
3. Shall I store my potatoes or market them direct from the field?
4. How shall I grade them?
5. What shall I do with my culls?

PIG PROJECT STUDY OUTLINE.

RAISING PIGS ON OWN ACCOUNT—A PRODUCTION PROJECT.

I. Shall I raise pigs for my project?
   1. Do I like pigs?
   2. Is this section suited to the profitable production of pork?
   3. Do pigs fit in well with the farm management plan?
   4. Is cholera or any other disease likely to prevent profits?

II. What shall be my aim in raising pigs?
   1. Shall I feed one or more pigs during the summer to market in the fall or winter?
   2. Shall I aim toward building up a pure-bred herd for breeding purposes?
   3. Shall I make a combination of the aims above?

III. How shall I get a start?
   1. Shall I buy one or more young pigs?
   2. Shall I buy a sow which has been bred?
   3. Shall I buy pure-bred pigs or grades?
   4. What breed shall I buy?
   5. Do I know the points of a good pig?

IV. Can I give breeding animals proper management?
   1. Do I know how to manage the boar and sow at breeding time?
   2. Can I give a brood sow the proper care?
   3. Can I manage sow and pigs properly at farrowing time?

V. How shall I care for young pigs?
   1. What attention do they need before weaning?
   2. What care and feed shall I give them after weaning?
   3. What is the best method of weaning?
   4. Shall I allow my pigs to run in a pasture, or shall I feed them in a pen?
   5. What crops shall I grow for my growing pigs?
   6. What special care will my pigs need in summer?

VI. How shall I fatten my pigs for market?
   1. What records shall I keep that I may know how much the pork I am producing will cost?
   2. At what age will fattening for the market be most profitable?
   3. What is the most satisfactory ration I may feed for fattening?
   4. What is the most satisfactory method of feeding for maintenance during the winter?
   5. What special care will my pigs need in winter?

VII. What kind of hog house shall I build?
   1. What factors shall I keep in mind in building a hog house?
   2. Can I afford an elaborate house?
   3. Can I make a plan for such a house as I need and build it?

VIII. How can I prevent disease?
   1. Do I appreciate the importance of cleanliness and sanitation?
   2. Shall I give the pigs a chance to keep clean?
   3. Do I know how to prevent such common ailments as scours, worms, and lice?
   4. Do I know the nature of hog cholera, how to handle a case of infection and how to prevent such infection?
   5. Can I perform such simple operations as castration and extraction of teeth?

ALFALFA PROJECT STUDY OUTLINE.

INOCULATION AND USE OF LIME—A DEMONSTRATION PROJECT.

I. Shall I undertake to demonstrate the production of alfalfa in this section?
   1. Has alfalfa been grown successfully in this section?
   2. Are there any limiting factors which can not be supplied at a profit?
   3. Is it evident that lime is one of the factors which limit the growing of alfalfa in this section?
   4. Can lime be secured at a price that will allow a profit?
   5. Is it evident that inoculation must be practiced for successful growth of the crop?
   6. Will it be worth while to demonstrate the value of lime and inoculation in alfalfa culture?

II. Are my home farm conditions favorable to the growing of alfalfa?
   1. Is the soil of suitable texture and fertility?
   2. Is the soil of sufficient depth?
   3. Is the soil sufficiently well drained?
   4. Has previous cropping left it free of weeds which may have proven troublesome?
   5. Are there insect pests or diseases which may be beyond control?

III. How shall I prepare my land for a stand of alfalfa?
   1. In what condition has the land been left by previous crops?
   2. Does the soil need fertilizing?
   3. When and how should barnyard manure be used for an alfalfa field?
   4. Can I afford to use commercial fertilizers on my alfalfa land; if so, how much, of what kind?
   5. What proof have I that my soil needs lime?
   6. What form of lime shall I use? [1]
   7. How much lime shall I use to the acre? [1]
   8. How shall I apply the commercial fertilizer and lime?
   9. When shall I plow? How deep?
   10. What other treatment will be necessary to make a fine seed bed?

IV. What seed shall I plant?
   1. What variety of alfalfa will be best for this section?
   2. Where can I secure seed that will be best suited to this section?
   3. Have I planned to secure my seed sufficiently early?
   4. What precautions shall I take to be assured that the seed is free from noxious weeds?
   5. What would be a reasonable price for good seed?
   6. How shall I determine if the seed is of strong vitality?

V. How shall I seed my plat?
   1. In what season shall I sow the seed?
   2. What evidence do I have that the soil needs inoculation?
   3. What method of inoculation shall I use?
   4. Where shall I obtain the culture or soil?
   5. What specific directions shall I follow in inoculation?
   6. What method of seeding shall I use?
   7. Shall I use a nurse crop?
   8. At what rate shall the seeding be done?

[1] The form of lime and the rate of application may be factors which are to be tested or demonstrated.

VI. What care will be essential the first season?
1. Shall I attempt to secure a crop of hay the first season?
2. What treatment will aid in the control of weeds?
3. At what height shall the young plants be cut?
4. Shall the clippings be removed?
5. Will there be any advantage in disking or in any other form of cultivation?
6. If the stand is uneven or thin will it pay to reseed?
7. In what condition should the stand of alfalfa be left for the winter?
8. Will it pay me to use a top-dressing of manure in the fall?

VII. How can I control the insect pests and diseases of alfalfa?
1. What insect pests and diseases of alfalfa are likely to prevail in this district?
2. What methods of prevention and control are most successful in practice?

ORCHARD PROJECT STUDY OUTLINE.

RENOVATION OF OLD ORCHARD—A DEMONSTRATION PROJECT.

I. Shall I undertake to renovate an orchard as my project?
1. Am I willing to undertake a project with little hope of immediate financial reward?
2. Will it not be worth while to gain practical experience in orchard management?
3. Will it not be worth while to demonstrate to the community the value of modern methods?
4. May I not make arrangements whereby I may share in the future profits which may result from my work?

II. Is the orchard worth renovating?
1. Are the trees too old?
2. Does vigorous growth indicate a good root system?
3. Is there a good stand of trees?
4. Are the trees of a variety known to be profitable?
5. Can I control all pests which may prevail?

III. How shall I prune the orchard?
1. Do I understand the principles underlying the pruning of fruit trees?
2. What tools will be required for my pruning work?
3. Can I use the pruning shears with dexterity?
4. Can I remove large limbs properly by using the saw?
5. What time of the year shall I do my pruning?
6. Will it be necessary to start new heads on the trees by "dehorning"?
7. Will it be necessary to remove a great many water sprouts, suckers, diseased and dead branches?
8. What treatment shall I give wounds left in removing large branches?
9. How shall I treat the rough trunks that they may not harbor pests?
10. What part shall pruning play later in keeping my trees in shape and as an aid toward producing fine fruit?

IV. How can I change the trees to a more desirable variety?
1. Do I understand the principles underlying budding and grafting?
2. Are my trees in such shape that top-working will be profitable?
3. What method of top-working shall I use?
4. Can I make a successful cleft graft?
5. Can I do ordinary budding with dexterity?
6. At what time of the year shall I graft or bud my trees?
7. What variety shall I use?

V. What fertilizing shall I give the orchard?
   1. Do I understand the function of the fertilizing elements and their relation to tree growth?
   2. If severe pruning has stimulated a vigorous growth, will the trees need nitrogen?
   3. Will the application of fertilizers containing phosphoric acid and potash be beneficial?
   4. What is the cheapest and best form in which I can apply the elements needed?
   5. What are the objections to using barnyard and green manures the first year after the trees have been cut back severely?
   6. When and how shall I apply fertilizers?

VI. How shall I cultivate the orchard?
   1. What are the purposes of cultivation?
   2. What are the advantages of cultivation over leaving the orchard in sod?
   3. May it be advisable at any time to leave an orchard in sod?
   4. What implements will be required for the cultivation of the orchard?
   5. Am I able to do the plowing, harrowing, and cultivating which may be necessary?
   6. When should cultivation cease?

VII. Shall I use a cover crop?
   1. What is the distinction between a cover crop and the practice of intercropping?
   2. What important purposes do cover crops serve?
   3. What crops are suitable for the purpose?
   4. What crop shall I use and how shall I manage it to secure maximum returns?

VIII. How can I control orchard pests?
   1. What equipment will I need for spraying?
   2. Can I make Bordeaux mixture and lime sulphur sprays and apply them in such a way as to control fungus diseases?
   3. Can I use lead arsenate and Paris green effectively in the control of biting insects?
   4. Can I control insects with sucking mouth parts, such as aphids and San José scale?
   5. Do I know the life histories and habits of the insects I must control?
   6. What may I do to supplement spraying in the control of orchard pests?
   7. What may I do to get my neighbors to cooperate with me in the control of orchard pests?
   8. Will it pay me to buy a spraying outfit, or will it be more profitable to hire the spraying done?

IX. Shall I thin my fruit?
   1. What are the advantages claimed for the practice?
   2. What objections are there against it?
   3. Do I understand the details of thinning that I may practice it efficiently?

X. How shall I harvest my crop?
   1. What equipment will I need for picking?
   2. When is the fruit ready to pick?
   3. Do I understand the details of picking that I may practice it efficiently?
   4. If I need help in picking, can I manage the pickers to secure the best results?

XI. How shall I market my crop?
1. Shall I store my fruit or sell it directly from the orchard?
2. What preparations must I make for grading and packing?
3. What kind of package shall I use?
4. What system of grading and packing shall I follow?
5. Do I understand the details of grading and packing that I may do it myself or supervise it efficiently?
6. What plans must I make for marketing that I may get maximum returns?
7. What am I going to do with the fruit that does not grade up to standard?

POULTRY PROJECT STUDY OUTLINE.

DEVELOPING A FARM FLOCK—AN IMPROVEMENT PROJECT.

I. Shall I undertake the improvement of a flock of fowls as my project?
1. Is the flock of fowls at home in need of improvement?
2. Can I make arrangement to take hold of the flock on my own account?
3. Have I sufficient interest in fowls to enjoy the work?

II. What shall be my aim in the improvement of the home flock?
1. Shall I make a specialty of eggs for the market?
2. Shall I work toward special production of market poultry?
3. Shall I look forward to producing fowls for breeding and eggs for hatching?
4. Shall I increase the value of the flock for general purposes?

III. What breed shall I select?
1. What proof do I have that pure-bred fowls are superior to mongrels?
2. What breed is best adapted to my aim?
3. Shall I attempt to handle more than one breed and variety?
4. What variety shall I select?

IV. How shall I get my start toward a well-bred flock?
1. Shall I secure eggs for hatching?
2. Shall I secure baby chicks?
3. Shall I secure a pen of matured breeding fowls?
4. Shall I replace the mongrel males with birds of good breeding?

V. How shall I select and mate my fowls for best results?
1. Why is selection important in breeding?
2. What points shall I consider in selecting fowls for my breeding pen?
3. Do I know the characteristics of the breed and variety I am breeding?
4. Why is vigor and strong constitution important in all breeds?
5. Why should the male bird be given special attention?
6. What do I know about trap nesting and its value in the improvement of fowls?
7. Of what age should the fowls of my breeding pen be?

VI. How may I secure a good hatch of chicks?
1. Are my breeding fowls in condition to produce eggs with strong, fertile germs?
2. Why should I give special care to eggs intended for hatching?
3. What may I accomplish by proper selection of eggs intended for hatching?
4. Shall I use an incubator or hatch with hens?
5. Do I know from experience that I can manage an incubator successfully?
6. Can I afford to risk my best eggs while I am learning to operate an incubator?
7. How shall I manage sitting hens to secure the best results?

VII. How may I raise the chicks successfully?
1. Shall I use a brooder or depend upon hens?
2. Shall I buy a brooder or attempt to make one myself?
3. What needs of little chicks require special attention?
4. What system of brooding meets these requirements and fits my needs best?
5. Do I understand the details of brooder management?
6. Do I understand the details of management of hen and chicks?
7. Have I provided for the prevention of disease and pests?
8. What shall be my method of feeding and managing the chicks after weaning?
9. Do I have a good ration for growing chicks?

VIII. How may I increase the production of first-class eggs for the market?
1. Are the hens of the laying flock of suitable age?
2. Are male birds allowed in the flock which is producing eggs for market?
3. Are the hens fed a ration suitable to egg production?
4. Do they obtain clean, fresh water, grit, oyster shell, and charcoal?
5. Are they housed comfortably?
6. Do they obtain sufficient exercise?
7. Are they kept free from pests and disease?
8. Are the eggs gathered often and kept clean?
9. Shall I grade my eggs and work toward supplying a special market?

IX. How may I market my surplus fowls at a profit?
1. Shall I market my surplus males as broilers or roasters?
2. At what age shall I sell my hens?
3. What is the best system for me to use in fattening my fowls?
4. What rations will be profitable for me to feed?
5. What method of killing and dressing shall I use?

X. How shall I improve my poultry house?
1. Do I understand the essential features of a good poultry house?
2. Does my present house embody these features?
3. Will it pay me to remodel the old house or build a new one?
4. Can I plan a house suitable for my purpose which will embody all essential features?
5. Can I afford to build such a house?
6. Can I build the house myself or will I have to hire it built?
7. Where shall it be located?
8. Have I provided for suitable yards and runs?
9. Will proper drainage, protection from wind, and shade be provided?

FARM HOME PROJECT STUDY OUTLINE.

ORNAMENTATION OF HOME GROUNDS—AN IMPROVEMENT PROJECT.

I. Shall I undertake the improvement of our home grounds as a project?
1. What improvement can I make?
2. Does the improvement involve a knowledge of landscape art?
3. Have I a knowledge of art and horticulture as a foundation for such an undertaking?
4. Do I have a liking for such work?

II. What existing factors must I consider in the plan of my work?
1. To what extent may I modify present conditions?
2. How much time and money will I have to spend?
3. How large is the area to be included?
4. What features of this climate must I consider?

II. What existing factors must I consider in the plan of my work?—Continued.
    5. What bearing will the kind of soil have upon my plans?
    6. What about the water supply and drainage?
    7. Why will it be necessary to consider the exposure?
    8. What are the peculiarities of the site which I must take into consideration?
    9. To what extent must I consider the architecture of the house and other buildings?
    10. To what extent will I be free to use my own judgment in making my plans and in carrying them out?
III. What preliminary work should be done?
    1. What cleaning up about the yard is to be done?
    2. Are there any unnecessary and unsightly outbuildings to be removed?
    3. What can be done by a careful use of paint?
IV. What shall be the essential features of my plan?
    1. Shall I work for temporary or permanent effects?
    2. Shall I use a natural or a formal style?
    3. What walks and drives are necessary?
    4. What area shall be planted to lawn?
    5. Where are trees to be planted?
    6. What use is to be made of vines?
    7. Will a wind break be necessary?
    8. What part are hedges to play in the plan?
    9. Where shall my flower beds be located?
    10. When my plan is worked out will it present a pleasing picture?
    11. Will it provide for convenience and comfort?
    12. Will its execution be within my means?
    13. How shall a map of my plans be drawn?
V. How shall I prepare for planting?
    1. What provision shall I make for irrigation and drainage?
    2. What grading will be necessary?
    3. What must be done to put the soil into proper condition?
    4. What is the best season for doing this preliminary work?
VI. How about the planting of trees?
    1. Can I plant trees properly with reasonable assurance that they will grow?
    2. What deciduous trees shall I plant?
    3. What evergreen trees shall I plant?
    4. Are there native trees which will serve my purpose?
    5. Where shall I secure my nursery stock?
    6. How large shall the trees be for planting?
VII. How about the planting of shrubbery?
    1. What hardy ornamentals will I need to carry out my plans?
    2. What shall I plant for hedges?
    3. Can I propagate any shrubbery for myself?
    4. Have I assurance that the shrubs I have selected will prove hardy and that they will grow under my conditions?
VIII. What vines shall I plant?
    1. What vines shall I plant around the house?
    2. What vines will be best for screens and fences?
    3. What annual vines shall I use for temporary effects?
IX. How shall I establish a lawn?
    1. When shall I plant my lawn?
    2. How shall I prepare the soil?

IX. How shall I establish a lawn?—Continued.
   3. What fertilizer shall I use?
   4. What seed shall I plant?
   5. Do I understand how to take care of a lawn properly?

X. What about flowers?
   1. What flowers shall I use for bedding purposes?
   2. What hardy annuals are suited to my purpose?
   3. What perennials shall I use in the borders?
   4. What use shall I make of bulbs?
   5. Does my selection of flowering plants provide for a succession of abundant bloom throughout the season?
   6. Do I understand the requirements of the plants I have selected?
   7. What methods of propagation are involved?
   8. Will I need a hotbed or frames for the production of plants?
   9. Can I make and manage a hotbed?

XI. Can I control prevalent pests?
   1. Have I considered insect pests and disease in the selection of plants?
   2. Can I control the common insects which may prove harmful?
   3. Can I control common plant diseases which may prove troublesome?

Suggested projects.—It should be borne in mind that the project should be adapted to the student, the course he is taking, and the community in which he lives. The following list will undoubtedly suggest other projects which will be profitable:

PRODUCTION PROJECTS.

1. Field crop production: Growing one-half acre or more of a field crop suited to the district.
2. Vegetable production: Growing one-fourth acre or more of a truck crop suitable to the district.
3. Flower production: Growing one-tenth acre or more of flowers for the market.
4. Home garden: Taking charge of home vegetable or flower garden.
5. Fruit production: Taking charge of bearing trees, a berry patch, or vineyard, and marketing the product.
6. Orchard development: Starting an orchard.
7. Developing a field of alfalfa or other perennial forage crop.
8. Developing a meadow or pasture.
9. Animal production: Poultry, pork, beef, mutton, wool, veal, and dairy products.
10. Development of breeding animals.

DEMONSTRATION PROJECTS.

1. Trying out crops new to district.
2. Variety tests.
3. Rotation of crops.
4. Fertilizer tests.
5. Care and use of banyard manure.
6. Use of cover crops and green manures.
7. Value of seed selection.
8. Methods of seeding.
9. Methods of cultivation.
10. Methods of orchard management.
11. Methods of feeding.
12. Use of preventive serums, dipping and other methods of preventing animal diseases.

13. Control of insects and other animal pests.
14. Control of weeds.
15. Control of plant diseases.

IMPROVEMENT PROJECTS.

1. Improving the home grounds in whole or in part, such as planting trees or developing a lawn.
2. Improving the school grounds.
3. Improvement of flock of poultry or herd of larger animals.
4. Plant improvement. Developing new strains by methods of plant breeding.
5. Community surveys and other organized work leading to rural betterment.
6. Construction or remodeling of farm buildings.
7. Concrete construction, building of fences, and making improvements involving principles of farm mechanics.
8. Construction of farm home necessities and conveniences.
9. Drainage of farm land.
10. Road construction, terracing, and leveling.

MANAGEMENT PROJECTS.

1. Taking general management of a farm.
2. Keeping farm records.
3. Making farm surveys.
4. Replanning problems.
5. Managing an orchard.
6. Managing a dairy.
7. Managing a farm woodlot.
8. Managing a poultry plant.
9. Managing a breeding herd or flock.
10. Managing work animals.

SOME PROJECT PROBLEMS.

The home-project plan has not been used sufficiently long to have established a very definite order of procedure. Many phases of its application are still in process of development, some of them being yet in the experimental stage. The following problems are suggestive of some questions which are being given attention at this time by those most interested. The extent to which the plan is adopted will depend in great measure upon how well some of these problems may be solved.

Supervision of projects.—The success of the home project will depend to a great extent upon proper supervision. There are so many factors which will determine the time taken for supervision that no rule can be laid down as to the number of students one teacher should supervise. The number is limited, however, when compared with the number taken care of with the usual academic, classroom instruction. Project work when conducted properly is expensive. As summer supervision is most important, schools which can not afford to hire an instructor for the full year may well hesitate about adopting the plan. Adequate means of transportation should be provided for efficient supervision, which means another item of expense.

The teacher should not scatter his attention over too wide a range of projects. He may well center his efforts upon the leading industry

of the district or upon a phase of farming most needed. To aid the teacher in centering his efforts upon one or two kinds of projects, some schools have adopted the alternate plan of subjects and projects. If four years of agriculture are outlined, the first and third years' work is given one year and the second and fourth years' courses and projects are worked out the next.

Fitting projects to the course of study.—It has been found most satisfactory to make the project sufficiently extensive to correlate with one year's work. In States where the home project is the basis for the teaching of agriculture, there is a question as to whether the class work and study of agriculture shall grow out of the project or whether the project shall develop from the agricultural study. If it is decided to require a project of each agricultural student the question will arise, To what extent shall the regular class work be devoted to projects, and to what extent shall the student pursue an individual project study?

Giving credit for projects.—It is customary to require two hours of practical work in field or laboratory for one hour's credit. Shall credit for home-project work be given upon the same basis and allowance for this work be made in making up the schedules? The question may arise as to whether one type of work is not worth more credit than another. To what extent shall quality of work and results obtained be considered in giving credit? If extra time is put in on projects shall extra credit be given? Shall the student's record of time be used in awarding credit, or labor-requirement tables be worked for different farm operations? The problem of giving school credit for home work is being given attention so it may soon be possible to answer these questions and others which may arise in a more satisfactory way than at present.

Contests, prizes, and awards.—In the elementary school most of the home work in agriculture has been in connection with club work in which the contest idea is a strong feature. Some teachers in the high school have linked their home-project work with the organized club work. The question arises as to just how far the high school teacher should use the contest idea, and to what extent prizes and awards other than regular school credit shall be given as incentives in regular projects.

To what extent shall projects yield a profit?—Boys in the high school have reached an age where they are beginning to consider values in terms of dollars and cents. One of the chief educational values of the home-project plan lies in the fact that through it the boy may be taught the value of a dollar. If this fact is considered, the question may well be asked, Is not the production project the nost profitable from an educational point of view? While making a profit may be the chief aim of a production project it may enter into other projects

as well. If a student carries on a successful project of any other type he should have hope of some reward in addition to the school credit he may gain. It may be better to assign at the beginning of the work a project where there is hope of immediate profit. As the student grows older he will appreciate better the fact that many of the profits in farming are not gained immediately.

Securing cooperation of parents.—It is not always an easy matter to get the parents to agree to let the boy receive the profits from his project. Neither will they at all times agree to let the student carry on a project according to the plans he may work out in connection with his course of study. In fact, the securing of the cooperation of the parents is one of the most difficult problems in certain sections. As a rule, the teacher will accomplish more by working quietly to win the confidence and good will of the parents and patrons than he will by making arbitrary rules. A campaign of education among parents and an extension of aid from the agricultural department of the school are coordinate in some sections with the project work. The agricultural instructors are required to carry on extension work among adults while they are supervising the projects of students.

Substitutes for home projects.—In many schools there will be students interested in the study of agriculture who do not live upon farms, or who are not able to carry out a project which will fit in well with their course of study. It is possible that practical work may be secured for such students that will accomplish the same results as a home project. If a boy is taking a course in dairying and can not take care of cows at home, it may be possible that he can secure work upon a dairy farm. If his work is such that it will fit in with a project plan there should be no objections to giving him credit for the work. Likewise, a student of horticulture may work in a commercial orchard or a market garden and get practical experience which will be worthy of credit if it is connected with the work of the school.

Preparation of teachers.—Possibly the factor which limits most the teaching of practical agriculture is the lack of training among teachers for this kind of teaching. Teachers who are prepared to succeed in the supervision of home projects are such men as are in demand for various phases of extension work. As the demand for such men at present is greater than the supply, comparatively high salaries must be paid. It is worth while for teachers to make an extra effort toward giving practical training to their students, if considered only from the selfish view of getting experience in a kind of training which is in strong demand. In several of the agricultural colleges the departments of agricultural education are now giving special attention to practical training for project work.

WASHINGTON : GOVERNMENT PRINTING OFFICE : 1916